

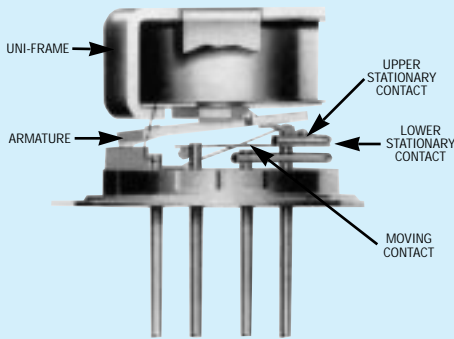
TELEDYNE RELAYS

HIGH VIBRATION TO-5 RELAY DPDT

**SERIES
412V
432V**

SERIES DESIGNATION	RELAY TYPE
412V	DPDT basic high vibration relay
412DV	DPDT high vibration relay with internal diode for coil transient suppression
412DDV	DPDT high vibration relay with internal diodes for coil transient suppression and polarity reversal protection
432V	DPDT basic high vibration, sensitive relay
432DV	DPDT high vibration sensitive relay with internal diode for coil transient suppression

INTERNAL CONSTRUCTION



DESCRIPTION

The TO-5 relay, originally conceived and developed by Teledyne, has become one of the industry standards for low level switching from dry circuit to 1 ampere. Designed expressly for high density PC Board mounting, its small size and low coil power dissipation make the TO-5 relay one of the most versatile ultraminiature relay available.

The High Vibration Series of TO-5 Relays are designed to withstand vibration levels of 250 to 380 g's at the frequencies noted when tested on a resonant beam for 10 to 20 seconds in the axis parallel to contact motion (x axis), or 100 g's 10-2000 Hz for 20 minutes in the x axis. A unique magnetic circuit prevents contact opening (chatter) in excess of 10 microseconds under vibration or shock conditions.

Typical usage:

- Commercial avionics aircraft control
- Commercial aircraft control systems
- Transportation systems (Rail/Truck)

By virtue of its inherently low intercontact capacitance and contact circuit losses, the TO-5 relay has shown itself to be an excellent ultraminiature RF switch for frequency ranges well into the UHF spectrum. A typical RF application for the TO-5 relay is in hand held radio transceivers, wherein the combined features of good RF performance, small size, low coil power dissipation and high reliability make it a preferred method of Transmit-Receive switching (see Figure 1).

ENVIRONMENTAL AND PHYSICAL SPECIFICATIONS	
Temperature (Ambient)	-65°C to +125°C
Vibration (Note 3)	250 g's to 140±5Hz 350 g's to 170±5Hz 380 g's to 200±5Hz
Shock	150 g's for 11 msec. (Note 3) half-sine
Acceleration	50 g's (Note 3)
Enclosure	All welded, hermetically sealed
Weight	412V 0.09 oz (2.55 gms.) max. 432V 0.15 oz (4.26 gms.) max.

SERIES 412V/432V

GENERAL ELECTRICAL SPECIFICATIONS (-65°C to +125°C unless otherwise noted) (Notes 1 & 2)

Contact Arrangement	2 Form C (DPDT)	
Rated Duty	Continuous	
Contact Resistance	0.1 ohm max. before life; 0.2 ohm max. after life at 1A/28VDC, (measured 1/8" from header)	
Contact Load Rating (DC) (See Fig. 2 for other DC resistive voltage/current ratings)	Resistive: 1 Amp/28VDC Inductive: 200 mA/28VDC (320 mH) Lamp: 100 mA/28VDC Low Level: 10 to 50 µA/10 to 50 mV	
Contact Load Ratings (AC)	Resistive: 250 mA/115VAC, 60 and 400Hz (Case not grounded) 100 mA/115VAC, 60 and 400Hz (Case grounded)	
Contact Life Ratings	10,000,000 cycles (typical) at low level 1,000,000 cycles (typical) at 0.5A/28VDC resistive 100,000 cycles min. at all other loads specified above	
Contact Overload Rating	2A/28VDC Resistive (100 cycles min.)	
Contact Carry Rating	Contact factory	
Coil Operating Power	432V Series: 350 mw typ. at rated voltage @ 25°C	412V Series: 620 mw typ. at rated voltage @ 25°C.
Operate Time	432V Series: 4.0 msec max. at rated coil voltage	412V Series: 2.0 msec max. at rated coil voltage
Release Time	432V Series: 3.0 msec max.	432DV Series: 7.5 msec max.
	412V Series: 2.0 msec max.	412DV, DDV Series: 4.0 msec max.
Contact Bounce	1.5 msec max.	
Intercontact Capacitance	0.4 pf typical	
Insulation Resistance	10,000 megohms min. between mutually isolated terminals	
Dielectric Strength	Atmospheric pressure: 500 VRMS/60 Hz	70,000 ft.: 300 VRMS/60Hz
Negative Coil Transient (VDC Max.)	All DV, DDV Versions	1.0 max.
Diode P.I.V. (VDC Min.)	All DV, DDV Versions	100 min.

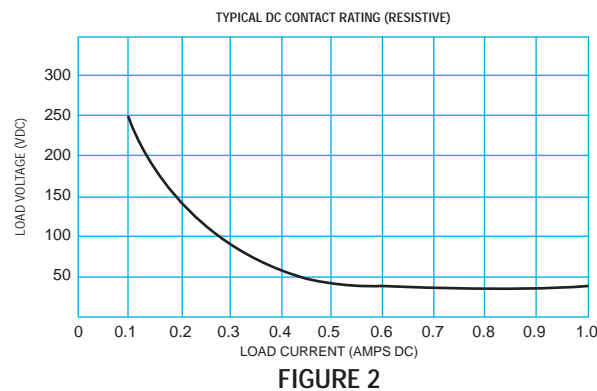
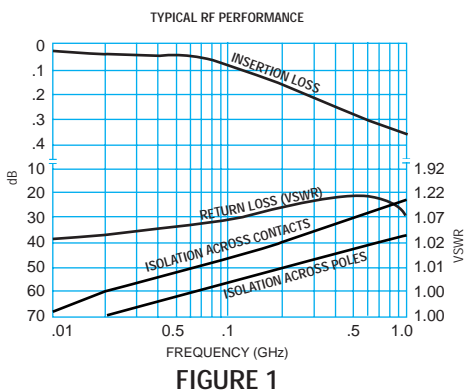
412V SERIES DETAILED ELECTRICAL SPECIFICATIONS (-65°C to +125°C unless otherwise noted) (Note 2)

	BASE PART NUMBERS	412V-5	412V-6	412V-9	412V-12	412V-18	412V-26	
		412DV-5 412DDV-5	412DV-6 412DDV-6	412DV-9 412DDV-9	412DV-12 412DDV-12	412DV-18 412DDV-18	412DV-26 412DDV-26	
Coil Voltage (VDC)	Nom.	5.0	6.0	9.0	12.0	18.0	26.5	
	Max.	5.8	8.0	12.0	16.0	24.0	32.0	
Coil Current (mADC @ 25°C) (Ohms ±10% @ 25°C)	412V	50	70	155	235	610	1130	
	412DV, 412DDV (Note 6)	33	44	125	215	470	1050	
Coil Current (mADC @ 25°C) (Note 5)	412DDV Min.	92.8	90.4	54.3	37.8	31.3	21.3	
	Max.	126.4	122.6	73.4	59.4	42.0	28.3	
Pick-up Voltage (VDC, Max.)		4.6	5.5	8.2	11.0	16.5	22.0	
Drop-out Voltage (VDC)	412V	Min.	0.14	0.18	0.35	0.41	0.59	0.89
		Max.	2.3	3.2	4.9	6.5	10.0	13.0
	412DDV	Min.	0.6	0.7	0.8	0.9	1.1	1.4
		Max.	2.8	3.4	5.3	6.5	10.0	13.0

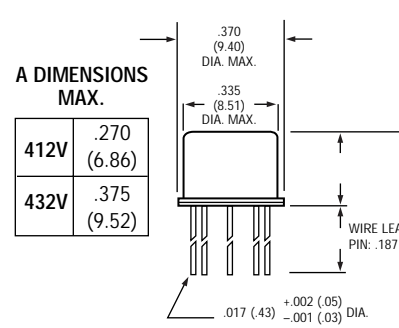
432V SERIES DETAILED ELECTRICAL SPECIFICATIONS (-65°C to +125°C unless otherwise noted) (Note 2)

	BASE PART NUMBERS	432V-5	432V-6	432V-9	432V-12	432V-18	432V-26
		432DV-5	432DV-6	432DV-9	432DV-12	432DV-18	432DV-26
Coil Voltage (VDC)	Nom.	5.0	6.0	9.0	12.0	18.0	26.5
	Max.	5.8	8.0	12.0	16.0	24.0	32.0
Coil Resistance (Ohms ± 10% @ 25°C)		80	120	240	480	950	1900
Pick-up Voltage (VDC, Max.)		4.6	5.5	8.2	11.0	16.5	22.0
Drop-out Voltage (VDC)	Min.	0.14	0.18	0.35	0.41	0.59	0.89
	Max.	2.5	3.2	4.9	6.5	10.0	13.0

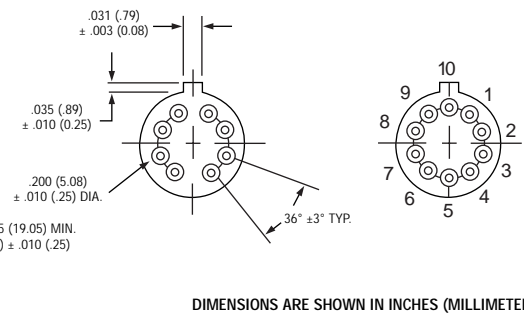
PERFORMANCE CURVES (NOTE 1)



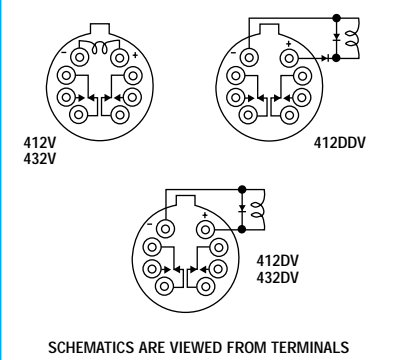
OUTLINE DIMENSIONS



TERMINAL LOCATIONS AND PIN NUMBERING (REF. ONLY)
(Viewed from Terminals)



SCHEMATIC DIAGRAMS

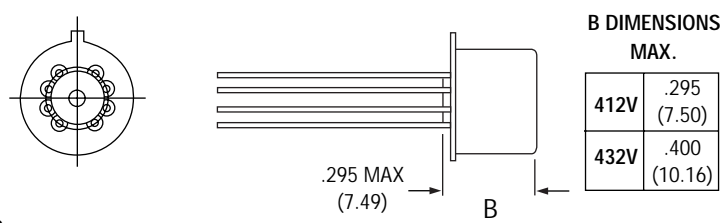


NOTES:

1. Characteristics shown as "typical" are based on available data and are best estimates. No on-going verification tests are performed.
2. Unless otherwise specified parameters are initial views.
3. Relays will exhibit no contact chatter in excess of 1.0 µsec or transfer in excess of 1 µsec.
4. For reference only. Coil resistance not directly measurable at relay terminals due to internal series semiconductor of 412DDV.
5. Measured at nominal voltage for 5 sec. maximum.

SPACER PAD

Relays can be supplied with a spacer pad attached to the relay header. The pad permits the relay to be spaced away from the mounting surface facilitating solder joint inspection. To order add **M4** to the part number. Example: 4XXM4-26.



NOTES:

1. Material: Polyester film.
2. Increased contact resistance by 0.01 ohm.